

# Pressure indicators describing by-catch and discards in selected Spanish fisheries

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## THE NEED....

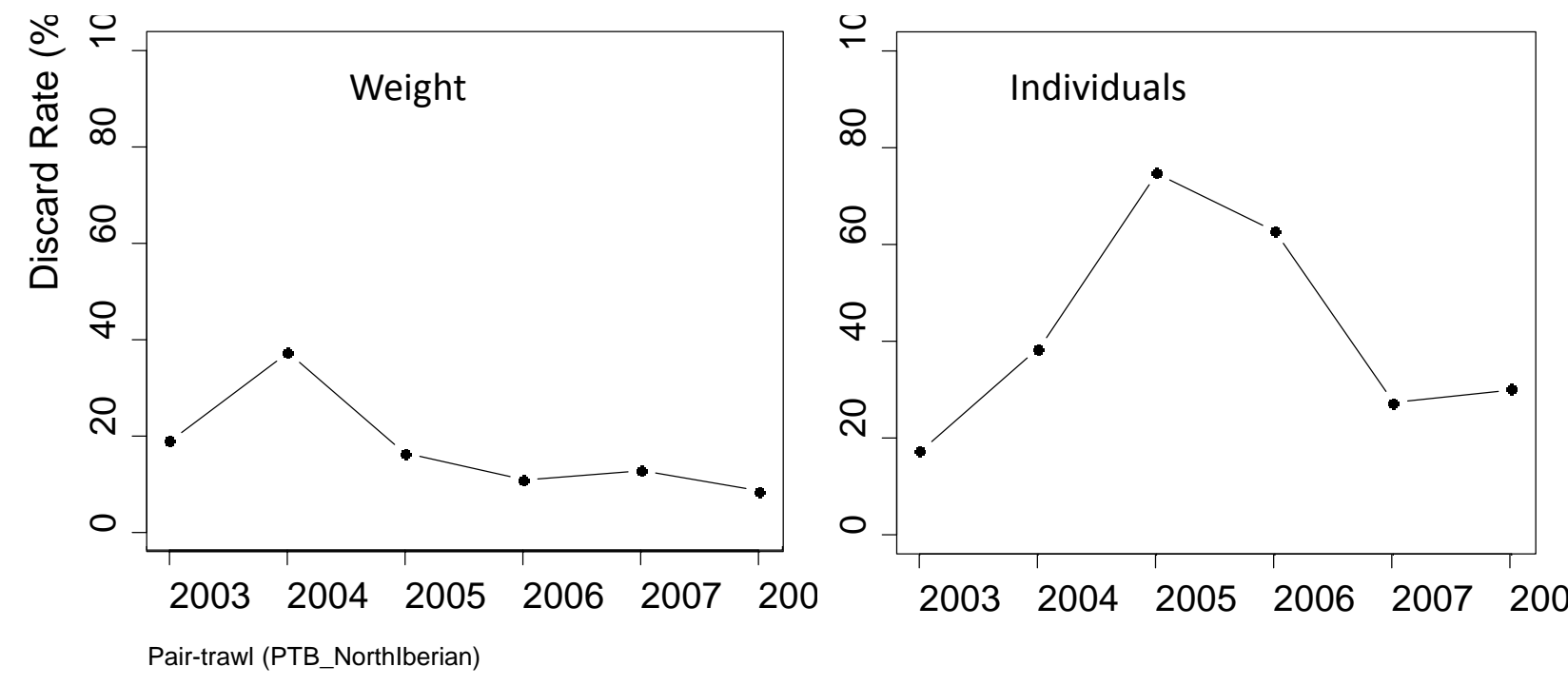
There is a need for simple and straightforward tools for a proper fisheries management. These tools are especially needed to monitor and manage discard issues. In the EU there is intensive data collection of bycatch and discard onboard commercial vessels but until now there have been few attempts to describe the general patterns in these data, and still less to understand the factors that determine what and how much is discarded. We propose here a set of indicators to monitor discard issues for selected Spanish fisheries. These indicators allow to describe the composition of catches and discards.

## THE PRESSURE INDICATORS...

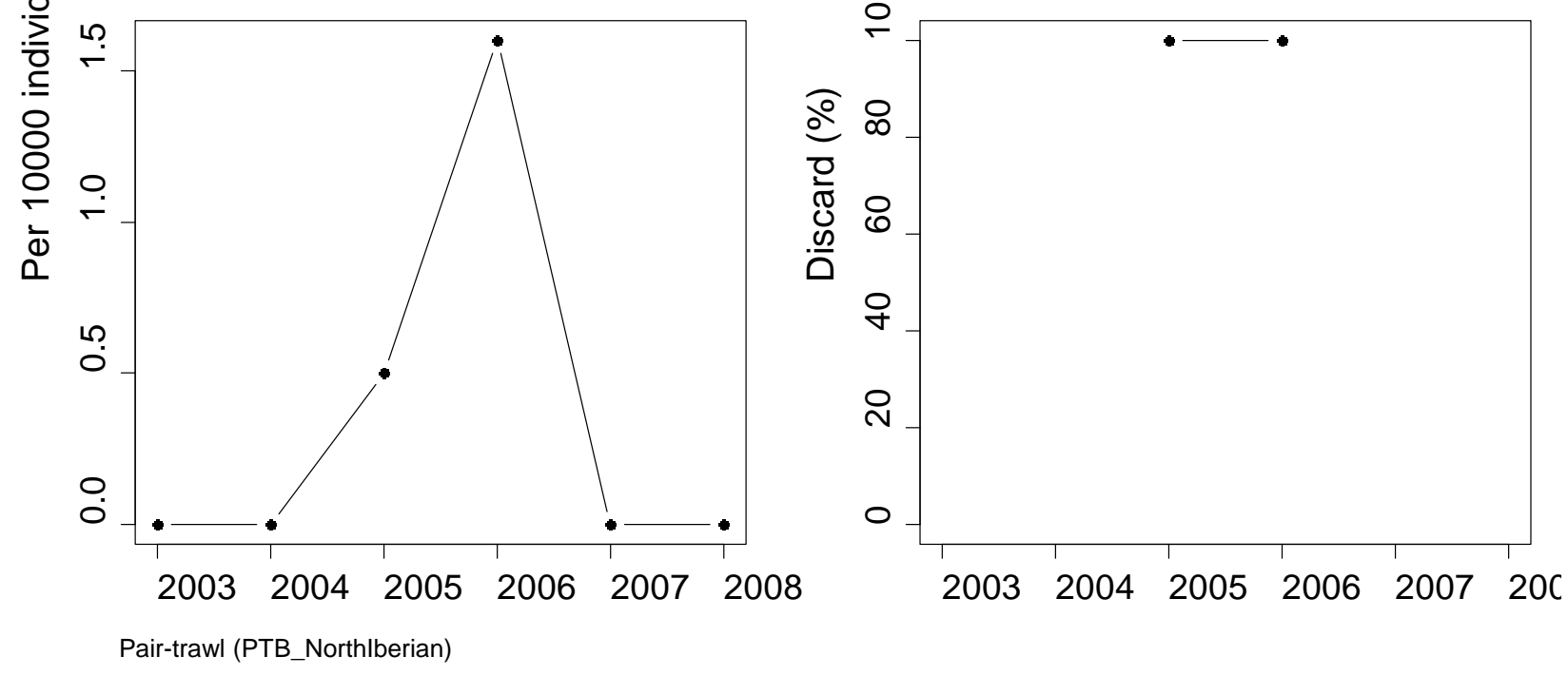
Pressure indicators were developed within the BADMINTON project (EraNet – MariFish) The goal of the Badminton project is precisely the development of a number of indicators that describe the composition of catches and discards at both the stock and community levels. Here we propose a set of general indicators for some Spanish selected fisheries: total discards and discards rate in the total catch and some representative species, sorting size for the total catch, retained and discarded, and also for some individual representative species, minimum marketable size, the relative abundance of threatened species in the catch and their discard rate and the Simpson´s Diversity Index of the catch, landing and discards. The indicators are estimated by fleet for a range of previously selected representative species both commercial and non-commercial. These include (1) the European hake (*Merluccius merluccius* ), (2) the spotted dogfish (*Scyliorhinus canicula*), (3) the most landed and (4) the most discarded species, and (5) a species representative of the metier. Other indicators are estimated for the whole catch and discard.

### Indicators for the whole catch

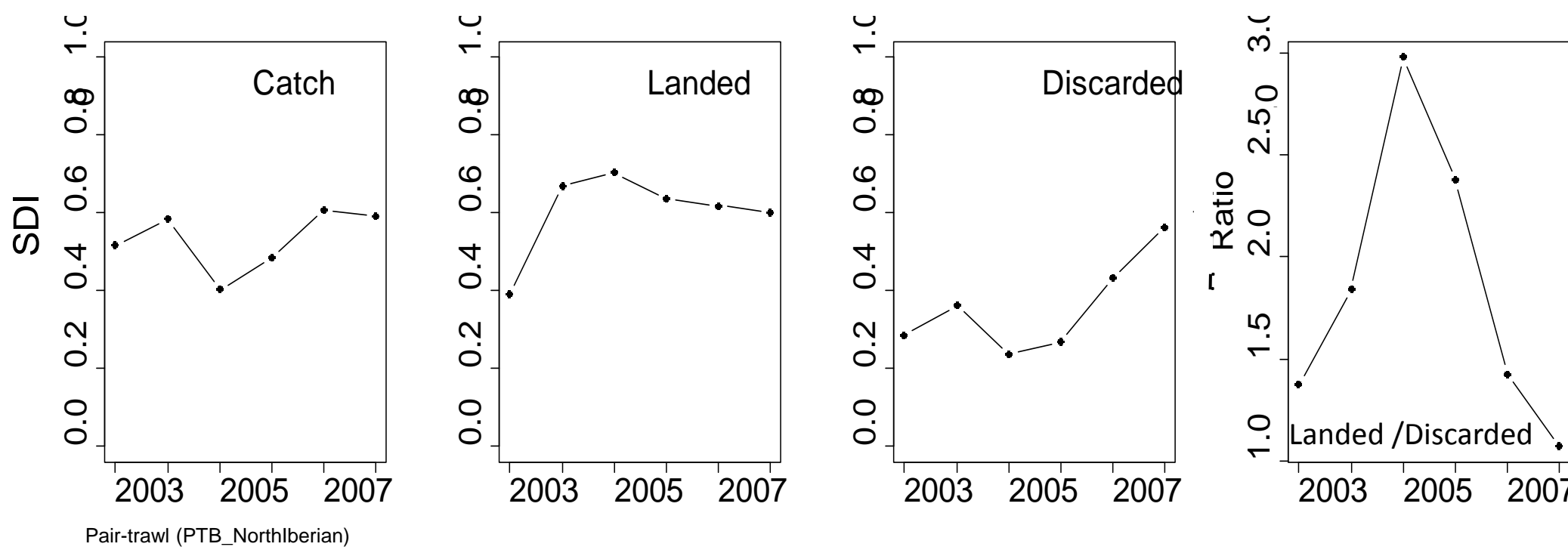
Discards rate in the whole catch



Threatened Species: Relative abundance of individuals in the Catch and their Discard Rate.

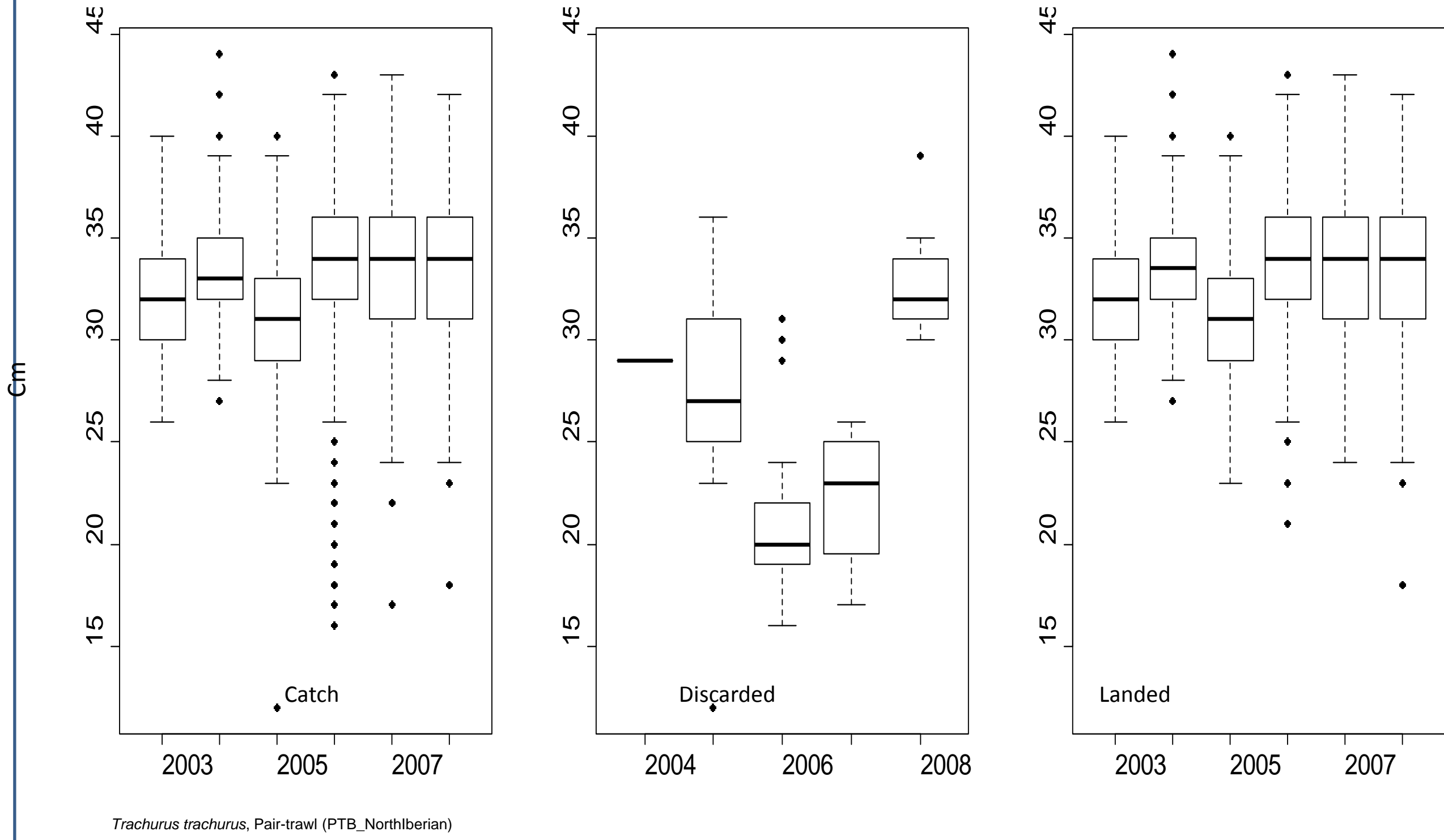


### Simpson´s Diversity Index

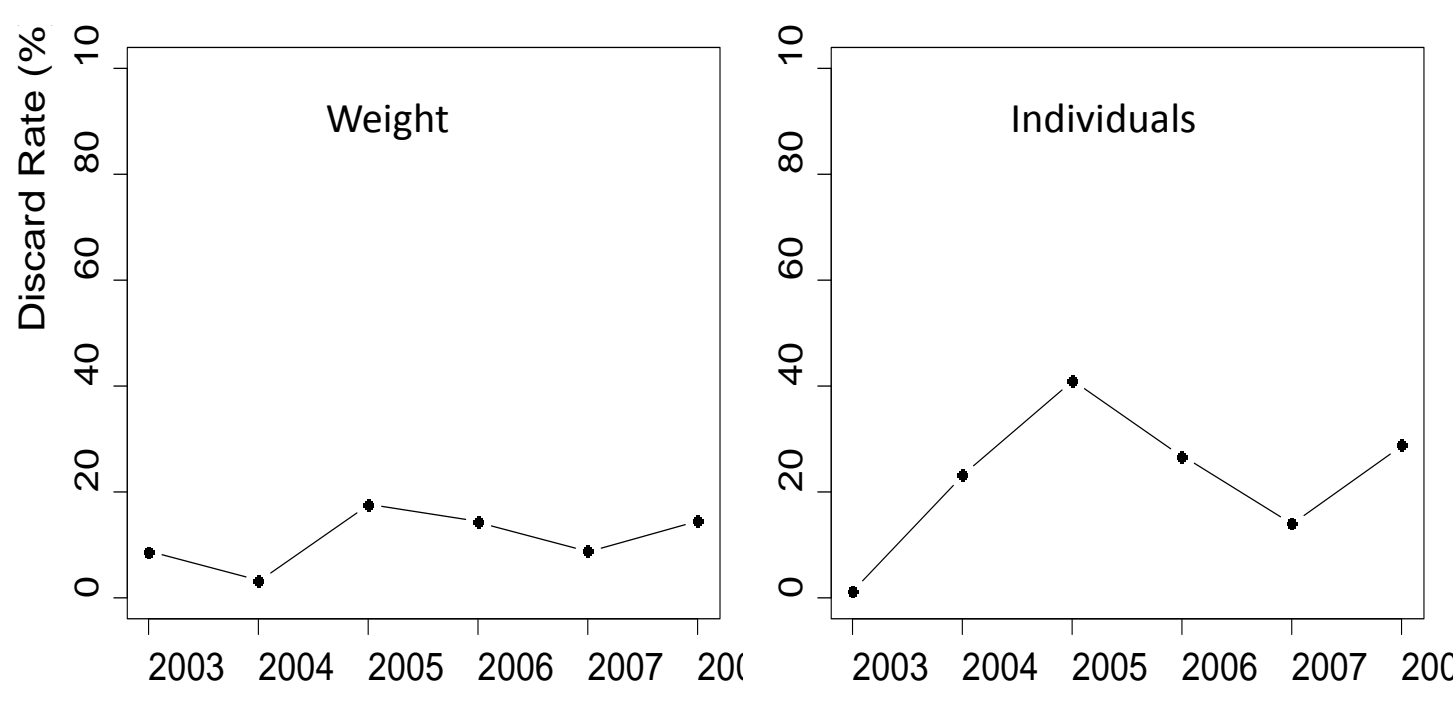


Indicators for the selected representative species (figures for metier Pair trawl North Iberian as example; We made the same for the other three metiers)

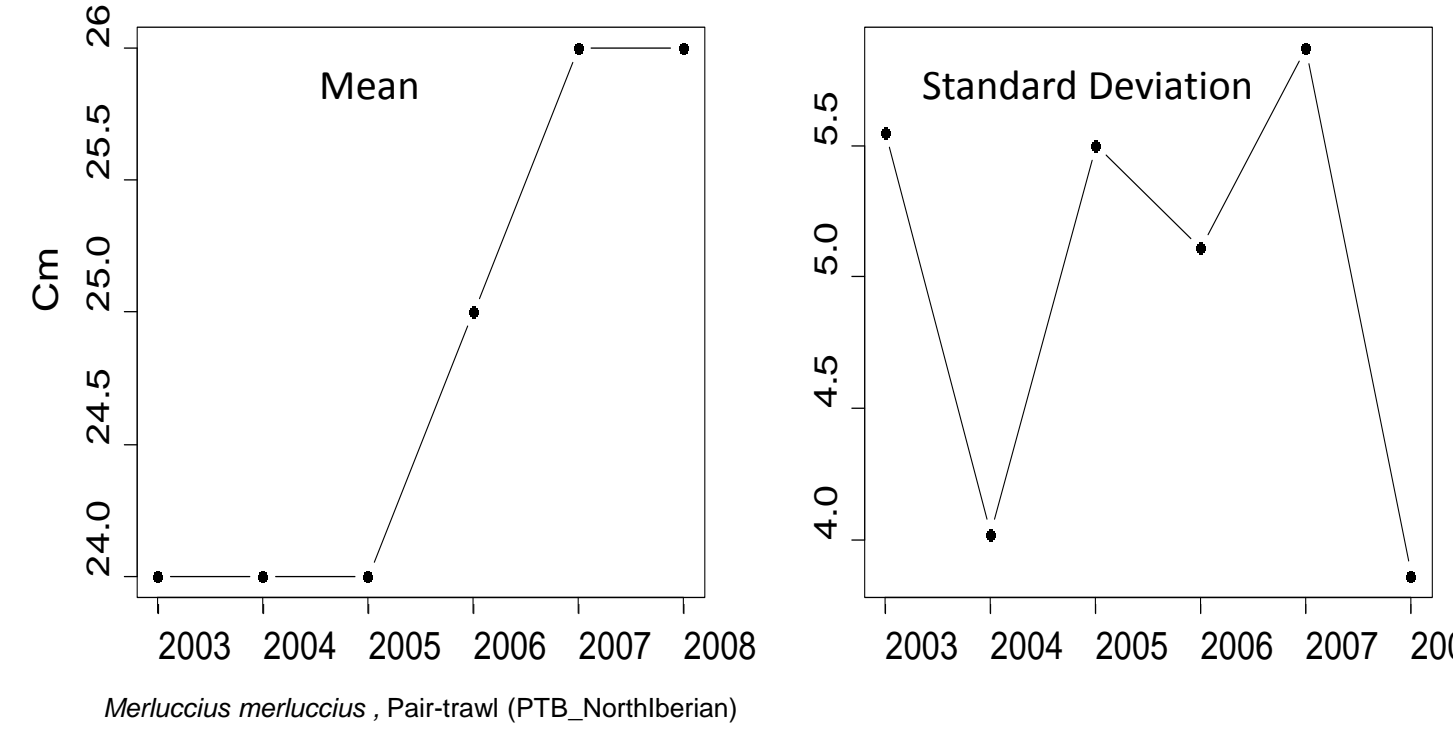
Sorting Size: Min., Q5, Q25, Median, Q75, Max, Mean and Std. Dev.



Discards rate in a selected species (*Merluccius merluccius*)



Minimum Marketable Size (Minimum length class landed by fishing trip in the entire set of trips of the Area for which it is calculated)



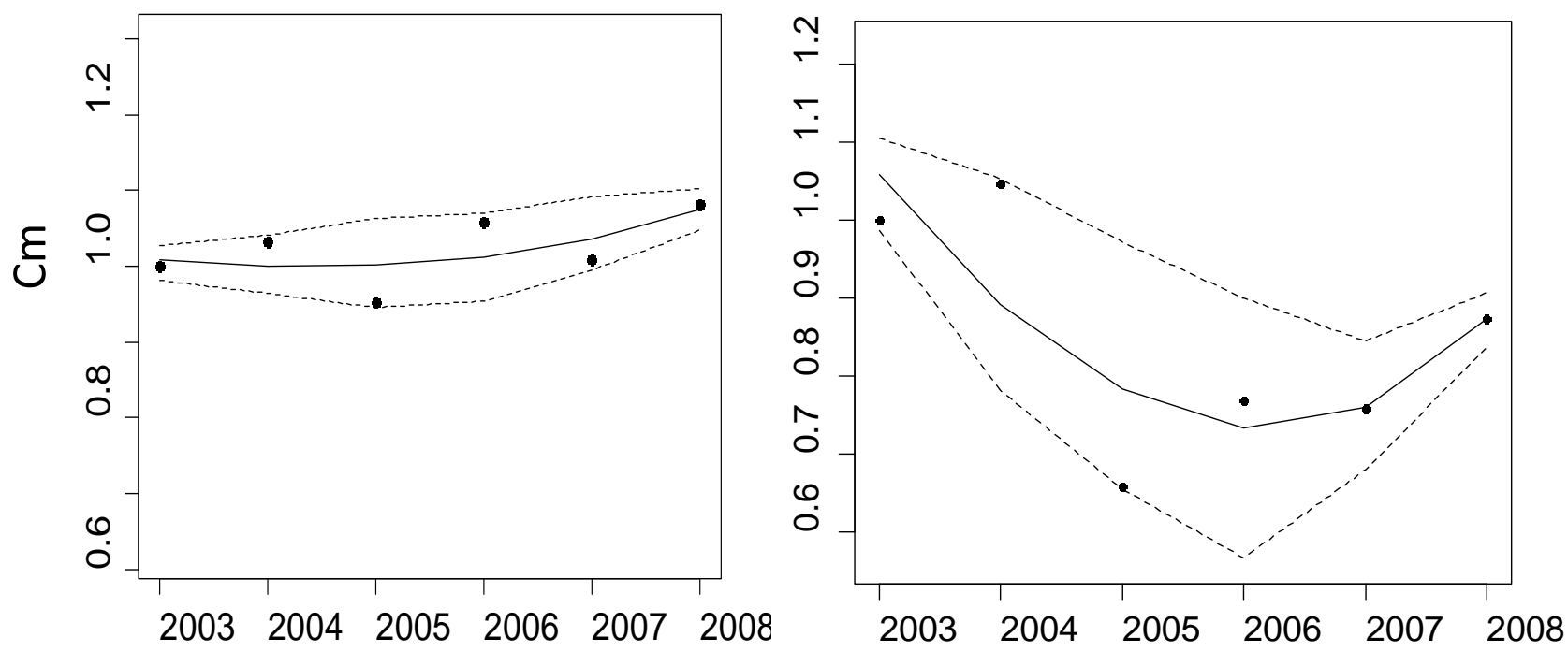
## THE SYNTHESIS INDICATORS...

One of the main problems when dealing with discard data is the huge amount of information needed to have a proper and complete view. Additionally this information is often difficult to interpret in its whole. We introduce 6 new synthesis indicators: Metier Catch Mean Size, Metier Discard Mean Size, Metier Discard Rate, Relative Minimum Marketable Size, Relative Landing Diversity and Threatened Species Relative abundance.

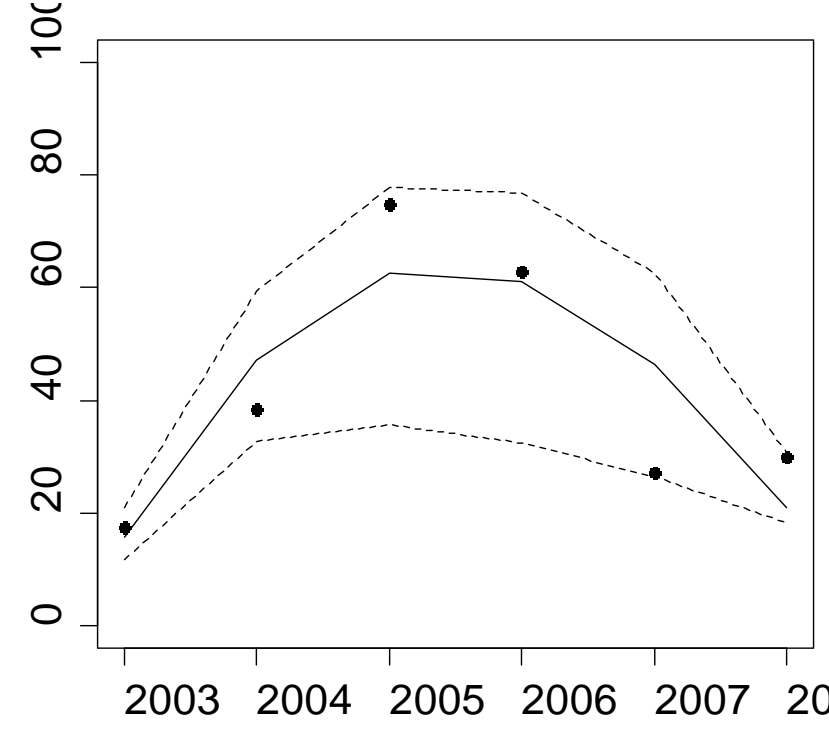
In figures we show the recent trend of these synthesis indicators for four selected Spanish fleets: Pair-trawl (PTB\_NorthIberian) and Otter trawl (OTB\_CelticSea) in Atlantic waters and Otter-Trawl (OTB\_Alboran Sea) and Trammel Net (GTR\_Balearic) in Mediterranean fishing grounds.

### Synthesis Indicators (Pair trawl PTB\_NorthIberian)

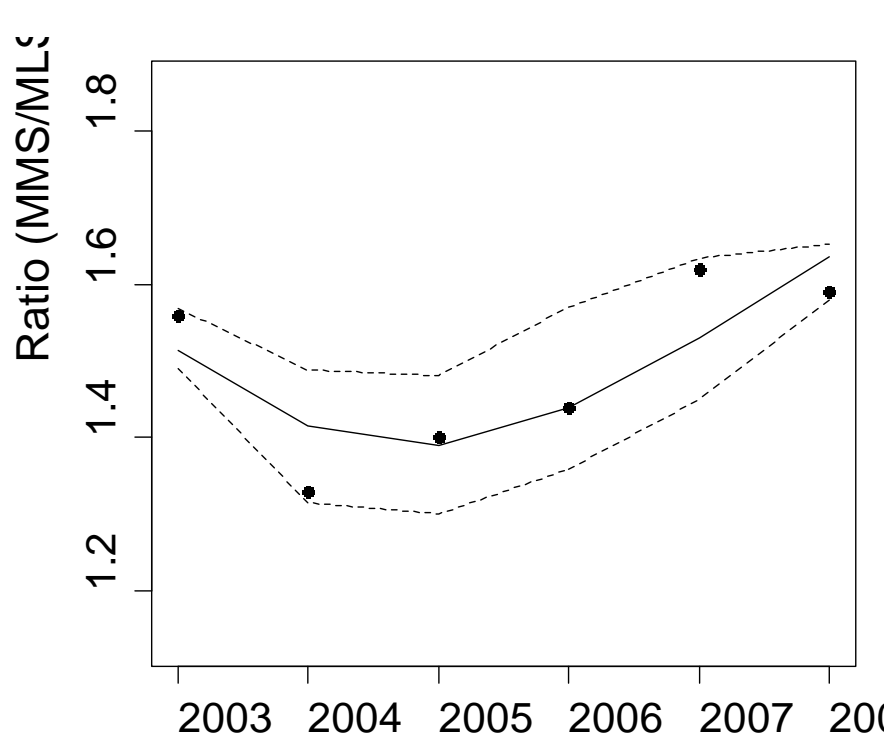
1. Métier Catch Mean Size
2. Metier Discard Mean Size
3. Discard rate
4. Relative Minimum Marketable Size
5. Relative Landing Diversity
6. Threatened Species Relative abundance



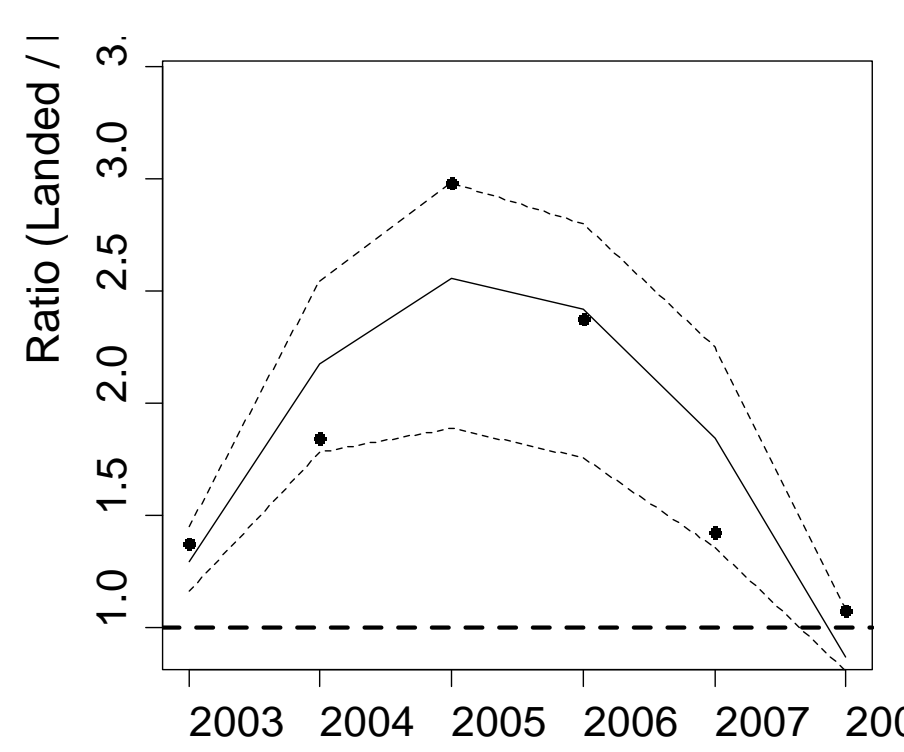
The mean size of each species is standardized according to the mean size of that species for the first year available in the database. The grand mean is obtained from the mean of the Standardized mean size values of the five representative species



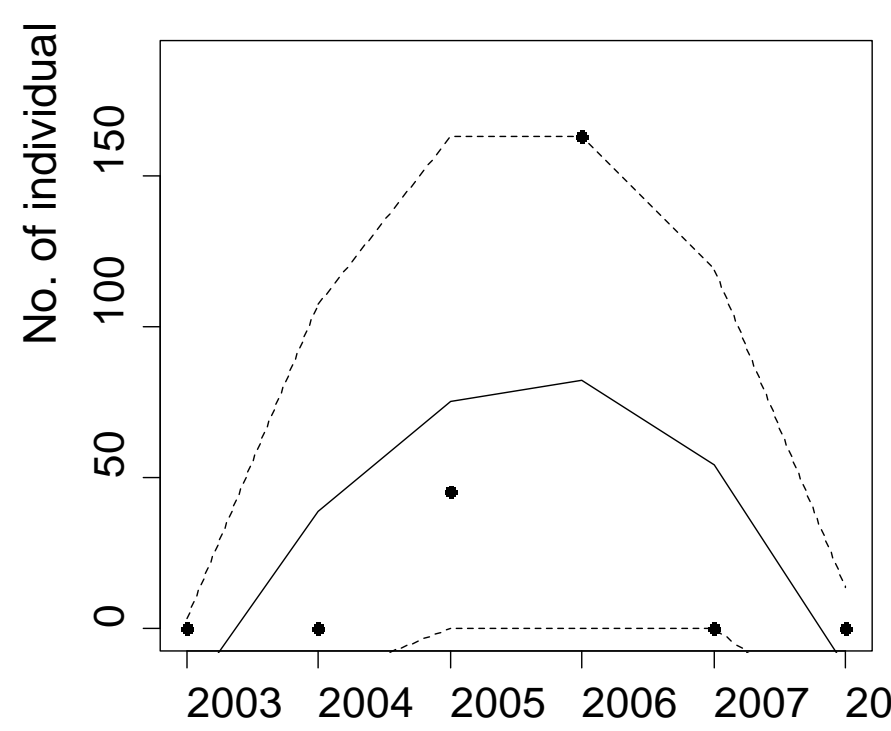
Percentage of individuals discarded in the full catch of the metier.



Minimum mesh size/minimum landing size (MMS/MLS)



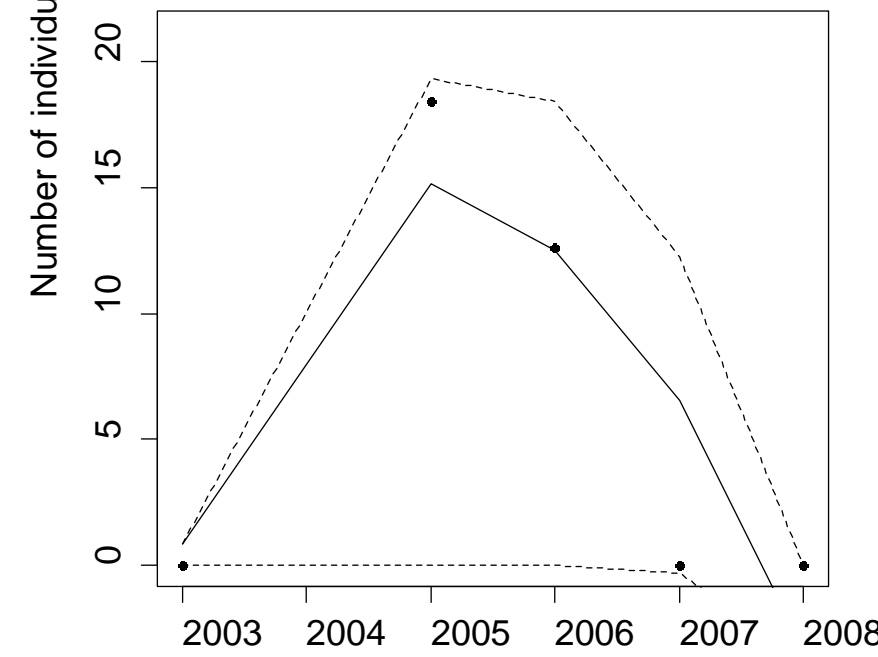
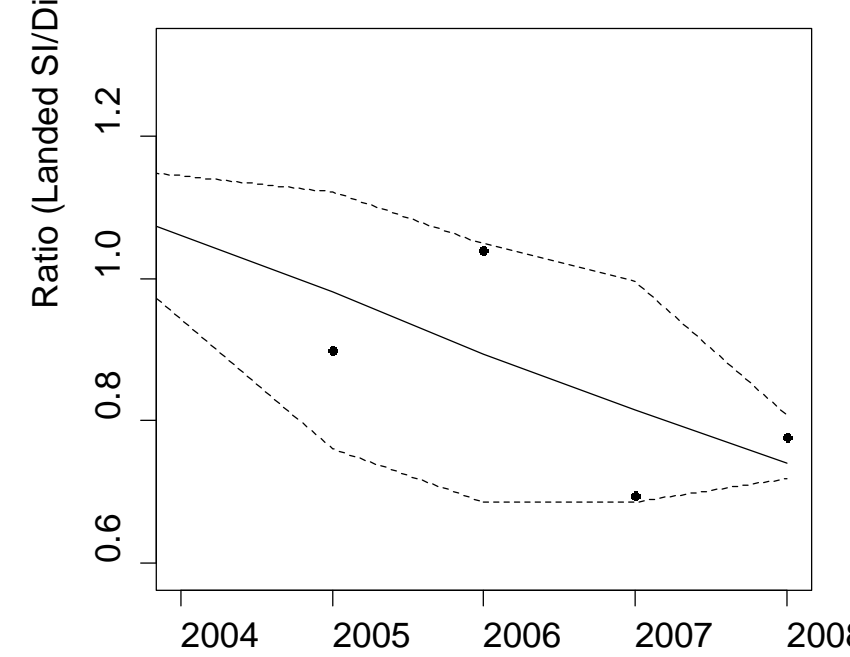
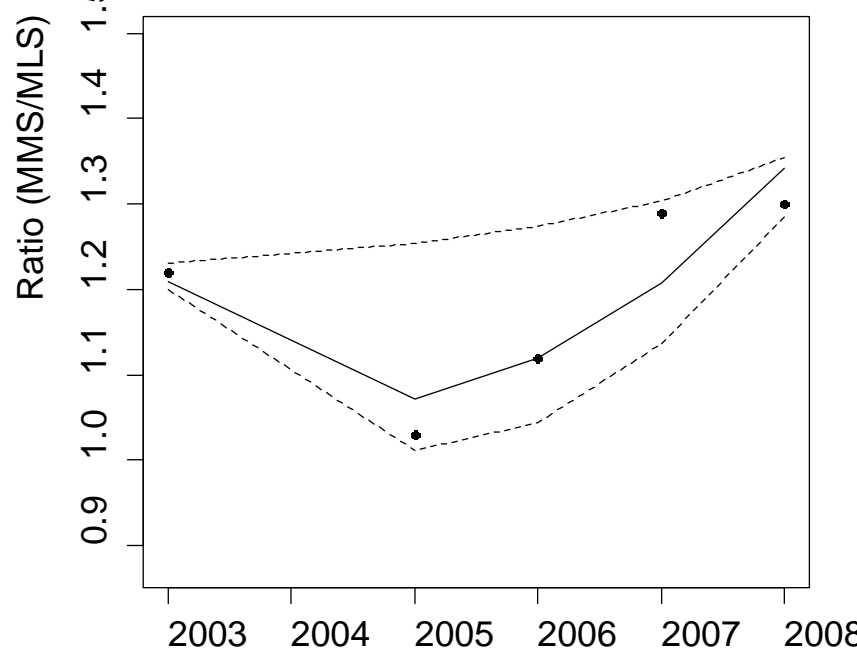
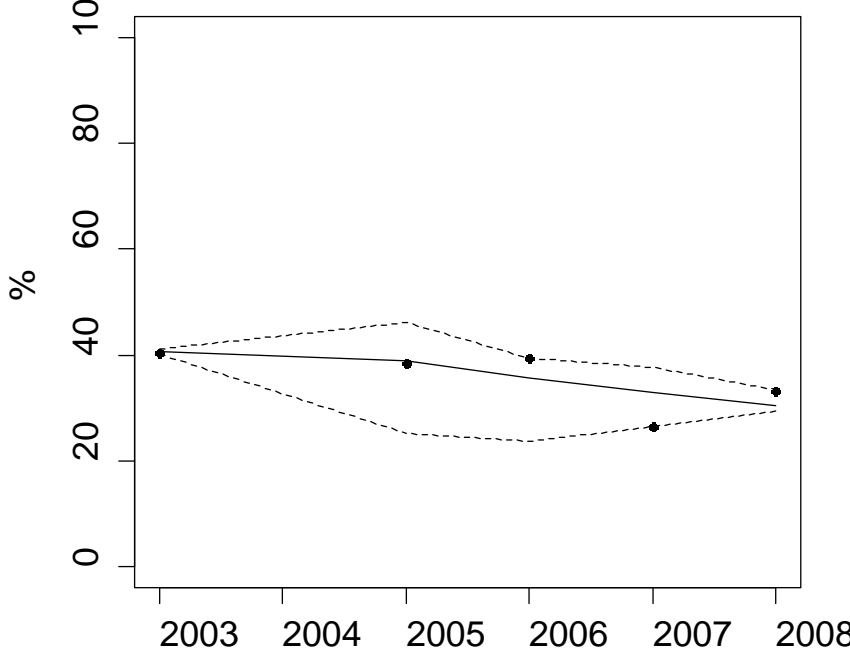
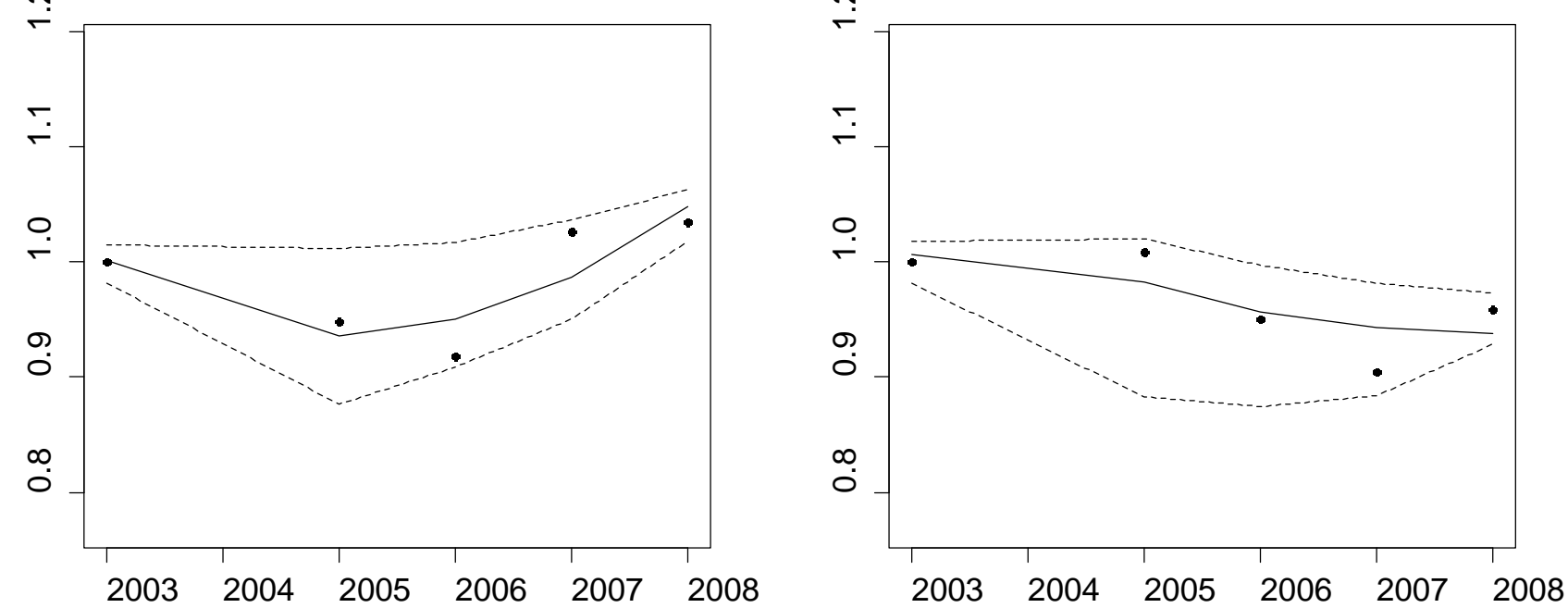
Simpson´s Index of Diversity (SID) of the landed individuals divided by the SID of the discarded individuals.



The number of individual of Threatened Species multiplied for one million and divided by the number of individual of the full catch.

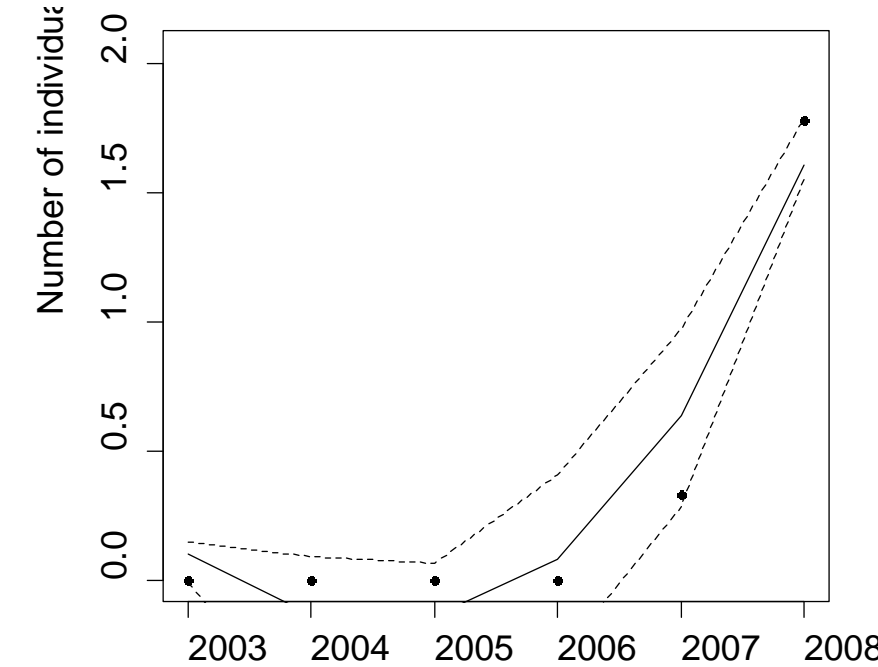
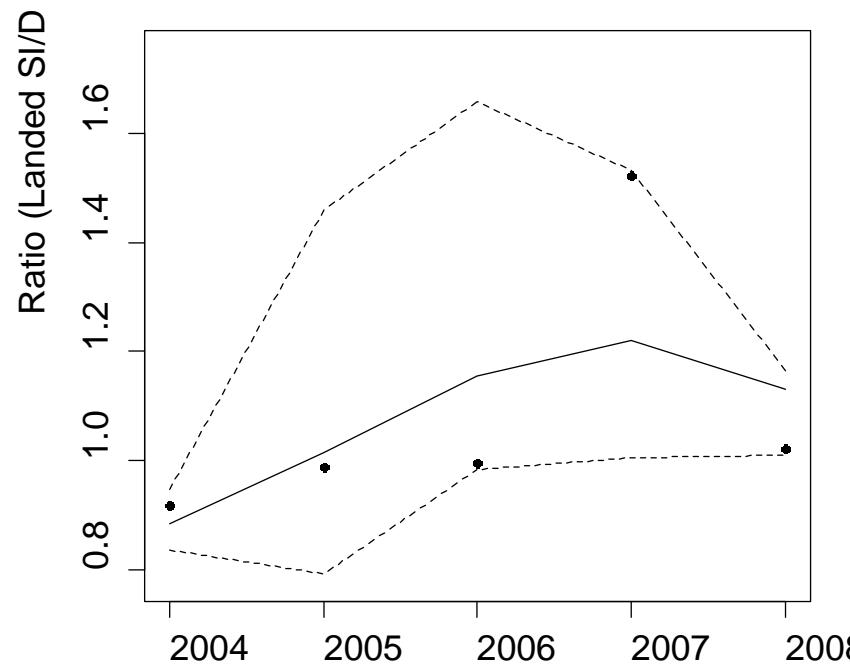
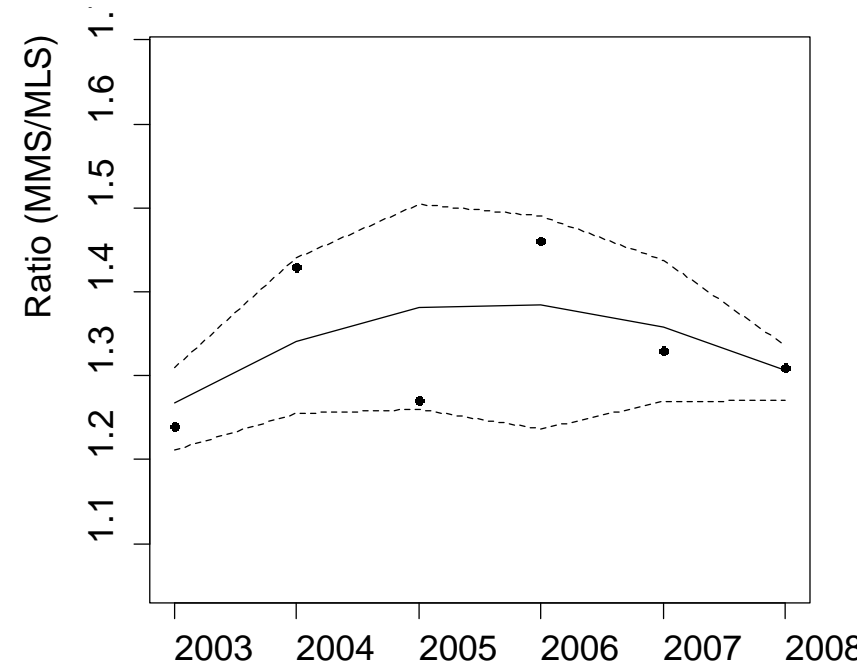
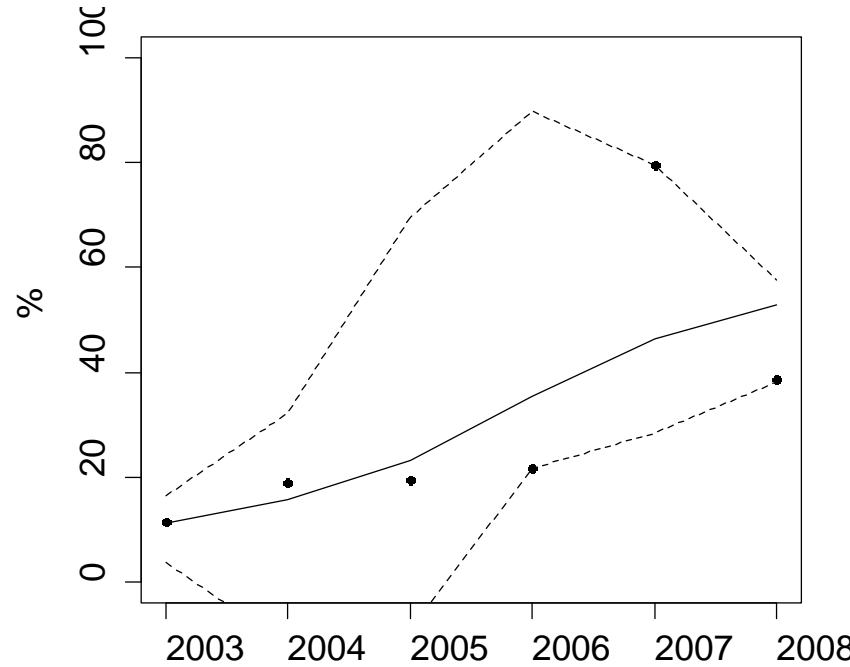
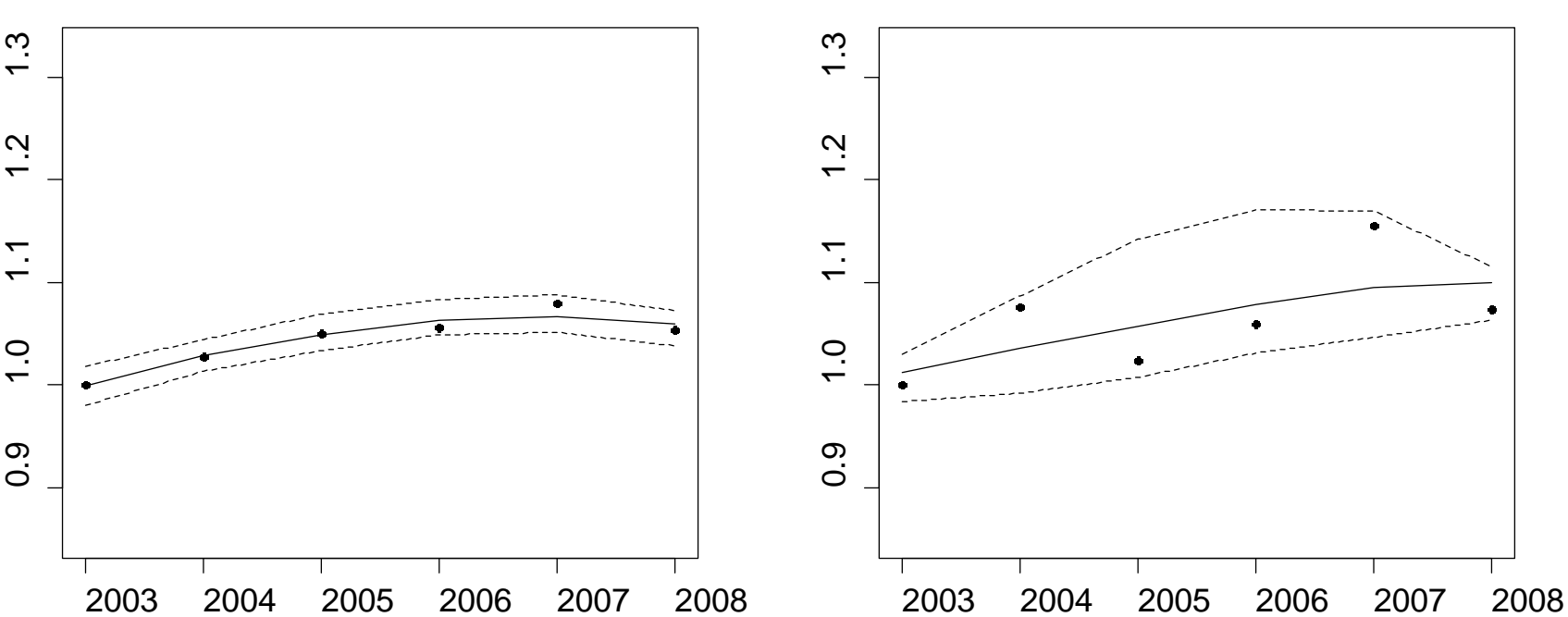
### Synthesis Indicators (Otter trawl OTB Celtic Sea)

1. Métier Catch Mean Size
2. Métier Discard Mean Size
3. Discard rate
4. Relative Minimum Marketable Size
5. Relative Landing Diversity
6. Threatened Species Relative abundance



### Synthesis Indicators (Otter trawl OTB Alboran Sea)

1. Métier Catch Mean Size
2. Métier Discard Mean Size
3. Discard rate
4. Relative Minimum Marketable Size
5. Relative Landing Diversity
6. Threatened Species Relative abundance



### Synthesis Indicators (Trammel Net GTR Balearic)

1. Métier Catch Mean Size
2. Métier Discard Mean Size
3. Discard rate
4. Relative Minimum Marketable Size
5. Relative Landing Diversity
6. Threatened Species Relative abundance

